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PROJECT NO. 51840

RULEMAKING ESTABLISHING	**§**	**PUBLIC UTILITY COMMISSION**
ELECTRIC WEATHERIZATION	**§**	
STANDARDS	**§**	**OF TEXAS**

ONCOR ELECTRIC DELIVERY COMPANY LLC'S
RESPONSE TO COMMISSION STAFF'S REQUEST FOR COMMENTS

Oncor Electric Delivery Company LLC ("Oncor") files this response to the request for comments from the Staff of the Public Utility Commission of Texas ("Commission Staff") issued on June 9, 2021. This response is timely filed on or before 3 p.m. on June 23, 2021, which is the deadline set by Commission Staff.

I. RESPONSE TO REQUEST FOR COMMENTS

Oncor appreciates the opportunity to provide this response to the following numbered item in Commission Staff's request for comments:

2. *To fulfill the requirements of Texas Utilities Code § 38.075(a), under what weather emergency conditions should the Commission require an electric cooperative, municipally owned utility, or transmission and distribution utility providing transmission service in the ERCOT power region to be able to operate its transmission facilities? At a minimum, please address standards for temperature, icing, wind, flooding, and drought conditions. For each, please address whether the standard should vary by region or by type of generation facility. Please provide any relevant support for your recommendations, including existing or proposed standards in other jurisdictions, or related studies.*

Response:

Executive Summary

Any weatherization standards adopted by the Commission should take into account existing requirements already embedded into the regulatory framework through applicable rules incorporating industry standards. The National Electrical Safety Code (NESC) provides detailed specifications for transmission facilities with respect to, among other things, temperature, wind, and ice conditions, all of which vary by geography. In appropriate circumstances based on operating experience, engineering judgment, and consideration of weather history and predictions, utilities may build their facilities to exceed NESC specifications or applicable industry standards; Oncor does exceed NESC specifications in some instances, as described below.

Older facilities are held to the standards applicable at the time of their installation, and widespread retrofitting of older facilities to become compliant with current standards—similar to bringing older homes into compliance with current building codes—would be expensive and burdensome to ratepayers.

In adopting weatherization standards, the Commission should avoid statewide rules and respect the geographic variations within Texas that are already reflected in the current governing standards. With respect to transmission interconnections with generation facilities, Oncor currently does not observe a need to impose transmission standards that vary based on the type of generation resource.

Overall, enhancements to the existing Storm Hardening Plan may provide a suitable template for addressing any weatherization standards the Commission may adopt in compliance with new PURA § 38.075(a), as adopted in the recently-enacted Senate Bill 3 from the 87th Regular Session of the Texas Legislature.

Background

Currently, utilities must weatherize transmission facilities based on a number of existing standards. Existing Commission rules mandate compliance with prevailing industry standards, including but not limited to the NESC, both when constructing new transmission facilities and also when rebuilding, relocating, or upgrading existing transmission facilities.[1] The NESC imposes numerous baseline requirements relating to vertical and horizontal clearances of electric transmission facilities as well as design standards for operating transmission facilities in extreme temperature, wind and ice conditions.

The North American Electric Reliability Corporation (NERC) also requires entities subject to its jurisdiction—including Texas transmission operators such as Oncor—to consider weather and its effects in a number of ways, including through: the development of operating plans to mitigate emergencies such as extreme weather events; vegetation management requirements based

[1] *See* 16 Tex. Admin. Code ("TAC") § 25.101(d) (imposing construction and operation standards for new and existing transmission facilities based on NESC, American National Standards Institute (ANSI), and other codes and standards generally accepted by the industry).

on, among other things, weather conditions; and evaluation of extreme events such as hurricanes and tornadoes.[2]

In accordance with good utility practice, utilities may also adopt additional standards that reasonably exceed NESC requirements or other industry standards in some instances based on operating experience and engineering judgment. (A comparison of NESC requirements to Oncor's transmission design standards for new facilities is provided below.) Oncor reviews and updates its transmission design standards at least every five years, and more frequently as needed to incorporate any interim changes in NESC requirements. These periodic reviews also account for, among other things, recent weather experiences and upcoming weather predictions.[3]

In Oncor's experience, these standards, as supplemented through additional utility-adopted buffers, have generally worked as intended. During the recent Winter Storm Uri weather event in February 2021, for example, Oncor experienced no broad, systemic loss of transmission facilities due to the storm. In fact, fewer than five discrete pieces of transmission equipment, out of thousands on Oncor's system, experienced some level of failure during the winter storm event based solely on cold temperature (*e.g.*, frozen equipment).

Weatherization for New Transmission Facilities

New transmission facilities are designed based on the most recent updates to NESC and Oncor's own design standards. In all instances, Oncor designs its facilities to at least meet NESC standards. Oncor also designs its facilities to exceed certain NESC standards, such as those relating to structural strength and conductor clearances. NESC standards change over time and should be viewed as a minimum baseline from which supplemental buffers may need to be added. Oncor applies its employees' decades of operating experience and engineering judgment, coupled with meteorological forecasting, to determine appropriate instances where it should exceed NESC design standards, consistent with good utility practice and a balancing of the various costs and

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[2] *See, e.g.,* NERC Emergency Operations standard EOP-11-1; NERC Transmission Vegetation Management standard FAC-003-4; NERC Transmission System Planning Performances Requirements standard TPL-001-4. The Federal Energy Regulatory Commission (FERC) certified NERC as the electric reliability organization authorized to approve and enforce federal electric reliability standards. FERC and NERC are currently considering numerous potential standards amendments relating to reliability in cold weather events.

[3] Oncor's past reviews have taken into account weather reports generally consistent with those of the state climatologist. Moving forward, Oncor will incorporate and consider weather predictions from the state climatologist's office, consistent with newly-adopted PURA § 38.075(a).

benefits associated with additional buffers that exceed required minimum levels. For example, Oncor designs its transmission lines to have vertical clearances that exceed NESC requirements in many instances. Among other things, this additional buffer allows for measurement and as-built construction variation. Of course, actual operating parameters for each facility may differ depending on the circumstances.

NESC imposes different requirements for temperature, wind, and ice conditions for different geographic areas. The following discussion addresses each of the topics mentioned in Staff's request for comments.

Temperature – Static ratings for transmission facilities are based on Standard 738 promulgated by The Institute of Electrical and Electronics Engineers, Inc. (IEEE). In accordance with standard industry practice, Oncor calculates its static facility ratings based on several variables, but assumes an ambient temperature of 104° Fahrenheit and a perpendicular wind speed of 1.3 miles per hour in full sun.

Oncor calculates and provides to ERCOT three types of facility ratings: Normal, Emergency (2-Hour), and 15-Minute. To do this, Oncor adjusts the static ratings of its transmission facilities based on the ambient temperature that is measured within a specific geographical area applicable to each facility. Oncor assigns its transmission facilities to one of the following seven areas: (1) Dallas/Fort Forth; (2) Wichita Falls; (3) Sherman; (4) Waco; (5) Tyler; (6) Odessa; or (7) Amarillo. The ambient temperatures measured for the applicable weather zone influence the ratings for facilities within that zone.

The 795 kcmil aluminum conductor steel reinforce (ACSR) "Drake" conductor, which is commonly used on Oncor's transmission system, provides a good example to illustrate these ratings. As with most other ACSR conductor, Drake conductor is typically designed with a maximum operating temperature (MOT) of 194° F. In accordance with Oncor's internal standards, the static rating of bare overhead conductor is determined at an ambient temperature of 104° F. The static rating of 795 ACSR Drake with an MOT of 194° F is 897 Amps. The ambient-adjusted ratings for Drake conductor under a variety of ambient temperatures is shown below in Table 1.

Ambient Temperature (° F)															
20°	**25°**	**30°**	**35°**	**40°**	**50°**	**60°**	**70°**	**80°**	**85°**	**90°**	**95°**	**100°**	**105°**	**110°**	**115°**
1278	1259	1240	1220	1201	1159	1116	1071	1023	999	973	947	919	891	863	832

Table 1 – Ambient Adjusted Ratings (Amps) of 795 ACSR Drake at Various Temperatures

Conductors have low thermal lag, meaning that they can heat up quickly. An inverse relationship exists between ambient temperature and line loading. As temperatures grow hotter and the conductor's MOT is approached, the metal conductor grows hotter and sags lower—this results in a lower maximum loading capability than at cooler temperatures. Drake conductor, like Oncor's other conductor and similar transmission facilities, can also be safely operated in much colder ambient temperatures than those listed in Table 1.

Wind – Wind loading primarily impacts transmission line design with respect to structural loading and horizontal clearances. Oncor's transmission structures are all designed to meet NESC Extreme Wind requirements under NESC Rule 250C. This rule requires Oncor's transmission structures to operate in 3-second gusts of high wind speeds: 90 mph in almost all of its service territory, and a slightly higher wind speed in a small, southeastern portion of its service territory near Lufkin that is closer to the coast and its attendant hurricane risks. The NESC also describes a variety of horizontal clearances which should be considered (measured from the conductors) when there is no wind and when the conductors are displaced due to 6 lbs./ft.^{2} of wind.

Ice – Ice impacts both the design of the supporting structures and the conductor itself. Oncor designs its transmission lines to withstand a higher level of ice loading than the applicable NESC Rule 250B minimum requirement of 0.5" of radial ice concurrent with a 40 mph wind. While this design for additional ice loading impacts the strength requirements of the supporting structures, it also impacts the clearances which are present between the conductor and objects below them, as natural elongating of the conductor from repeated sagging over time due to these heavy ice conditions requires a higher vertical clearance.

Flood – In order to minimize potential flooding impacts, Oncor's stations are located and designed such that equipment is located at least two feet above the 100-year floodplain level. Oncor's new transmission lines which cross lakes, rivers, or other bodies of water are designed and operated to generally meet required clearances when measured to specified water surface elevations, consistent with NESC Rule 232. And consistent with House Bill 4150 and the Commission's implementing rule, 16 TAC § 25.97, Oncor regularly inspects its existing transmission lines and addresses any transmission lines that it identifies as out of compliance with those requirements. However, most of Oncor's service area is not subject to the sustained flooding risk that coastal areas more frequently experience.

Drought – The NESC does not prescribe design standards for drought conditions. Oncor mitigates drought conditions and fire hazards by monitoring National Weather Service county advisories for high to extreme fire dangers and, in those circumstances, increases grid operator and field personnel awareness of the danger.[4] Oncor also proactively inspects wooden transmission structures and crossarms and regularly replaces with steel crossarms and/or steel or concrete poles. Relatedly, Oncor's vegetation management practices reduce hazards associated with drought conditions, such as wildfire, by maintaining transmission right-of-way in a manner that minimizes such risks. These practices include working with landowners, particularly in East Texas, to identify and remove trees located outside of Oncor's right-of-way that may nevertheless present increased levels of risk to those transmission facilities.

Weatherization for Existing Transmission Facilities

Because existing transmission facilities are subject to much greater variation than new transmission facilities, they are best viewed through a risk-based lens. Age and structure material play crucial roles in evaluating existing transmission facilities. As mentioned above, the NESC "grandfathers" requirements for existing transmission facilities based on the standards prevailing at the time of the facility's original construction or last major capital upgrade. Imposing current-day design requirements to older facilities could lead to very significant retrofitting costs for ratepayers.

Utilities adopt patrol, inspection, and maintenance practices to help ensure their transmission facilities may continue operating safely and reliably, including before, during and after extreme weather events. These practices include emergency-specific response plans as well as checklists for enhanced monitoring and inspections in preparation for peak summer and winter seasons.

Specifically, Oncor aerially patrols its transmission lines twice per year. Generally, these aerial patrols occur once in the spring and once in the fall. Oncor also conducts on-the-ground line patrols approximately every two years for wood-supported transmission lines and every five years for lines with steel or concrete support structures. Wooden transmission structures also receive specialized inspections every 8-12 years, depending on weather region.

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[4] Accumulations of dust or salt have not historically caused adverse impacts on Oncor's transmission facilities.

Based on these comprehensive inspections and risk assessments, every year Oncor's Capital Maintenance Prioritization Committee reviews, and approves when appropriate, proactive weatherization-related upgrades for its transmission system. Additional measures likewise help contribute to resiliency in extreme weather, such as soliciting mutual aid workers from unaffected utilities and maintaining a sufficient inventory of transmission structures, equipment, and other facilities that may be used to quickly restore damaged areas of the system in the wake of extreme weather.

Oncor's Storm Hardening Plan summary submitted to the Commission provides an overview of many of these programs and actions.

Regional Variation for Weatherization Standards

Any weatherization standards should take regional variation into account, consistent with NESC requirements that vary based on the different geography and weather present within Texas. As just one example, storm surge considerations potentially applicable to facilities in coastal areas should not apply to Panhandle facilities. As noted above, in applying ambient air ratings to its transmission facilities, Oncor already takes into account different weather from seven different areas of its service territory when adjusting transmission facility ratings, and any weatherization standards adopted should likewise recognize the importance of geographic variation. Texas's large size simply causes too much climate and weather variation to apply a one-size-fits-all approach for many of the potential weatherization factors raised in this question.

Generation Variation for Weatherization Standards

Transmission and generation facilities are inherently interactive, and those interactions depend on the state of the grid. But the grid is never static; its needs constantly change, sometimes rapidly. While Oncor sees no need for general weather-related rules based on the type of generation facility or source of generation interconnected to its transmission system, transmission service providers and ERCOT are continually evaluating the grid's needs, including whether specific types of equipment or facility configurations may be appropriate in individual circumstances.

Conclusion

NESC and other industry standards provide an existing framework to evaluate various weather impacts on transmission facilities. The Storm Hardening Plan summary that utilities annually submit to the Commission describes many of the aforementioned standards and policies,[5] and that rubric could prove useful as a building block for weatherization concepts the Commission is currently contemplating. For example, the Commission could bolster the reporting requirements in Storm Hardening Plans by mandating that utilities annually detail and submit to the Commission: (1) the number of circuit-miles of transmission lines that the utility rebuilt or upgraded; (2) the number of wooden transmission structures the utility replaced; and (3) the utility's proposed action plan following each weather event reported to the Commission, including identification of specific post-event restoration activities or facility replacements involving transmission facilities.

Oncor acknowledges that additional consideration and discussion around this complex and technical topic should continue to occur. Many of the relevant documents, however, involve sensitive data. To facilitate that discussion in light of the materials involved, Oncor invites Commission Staff to a table-top review of its transmission design and maintenance standards, policies, and related documents discussed in these comments.

II. CONCLUSION

Oncor appreciates the opportunity to provide this response to Commission Staff's request for comments, and it looks forward to providing additional input on the anticipated strawman rule from Commission Staff in the coming weeks.

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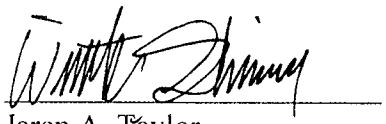
5 *See* 16 TAC § 25.95.

Respectfully submitted,



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